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THE PRACTICAL RESULTS OF RECENT STUDIES IN EDUCATIONAL PSYCHOLOGY¹

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When we consider the results of experiments in learning that have emanated from the psychological laboratories during the last decade and the investigations in experimental education that have been conducted during this same period, we are confronted with a mass of material that offers numerous points of contact with the problems of the schoolroom and suggests methods of instruction and principles of school management that are rich in promise. Still, on the other hand, there is an element of discouragement in all of this. The material is so extensive, and so unorganized and unrelated, that as yet it offers no thoroughgoing and well-digested body of facts from which to draw final and unequivocal conclusions in regard to the problems that arise in connection with the schoolroom. There are many important hints, a few definitely established facts and principles to guide the teacher, but there is much that is contradictory and uncertain in its application. Nevertheless there is a considerable amount of this material that can be directly utilized in its practical bearings by the teacher of today. It is to some of the more certain of the inferences that relate to the aims and methods of teaching that I wish to call your attention this morning.

All teaching, whether it is that of the elementary school, the college, or the university, has a few fundamental aims that it must set before itself if it is to accomplish results. In the first place, proper instruction aims at the formation of correct habits of both mind and body; again, it aims at the presentation of certain facts and principles and the grounding of the pupil in these facts and principles so that they shall become a part of his knowledge;

¹ Read at the meeting of the Harvard Teachers' Association, Cambridge, Massachusetts, March 15, 1913.

finally, and of chief importance, it aims at the developing of judgments and of general attitudes that are important in the interpretation of life in its various relationships. As far as the formation of habits and the instilling into the mind of facts and principles are concerned, the teacher's aim is to reduce the mental processes to their lowest terms, so to speak; that is, to eliminate consideration, comparison, judgment, and reasoning, and to make the mind automatic and quick to act without deliberation or elaborate thinking, in other words, to mechanize mental processes and to do away with consciously directed activities. On the other hand, the teacher must develop in the pupil the tendency and the ability to act in the light of reflective consciousness, rather than in terms of habit. These two aims are quite distinct and should be clearly separated in all good teaching.

To realize the first of these aims in instruction we must employ certain methods of teaching that may be characterized rather loosely as drill. It is therefore to the consideration of drill and the light that is thrown upon it from the standpoint of investigations in applied psychology and pedagogy that I wish first of all to call your attention. In recent years drill has been held in slight esteem by many, and while at one time it was the chief method of teaching, it has fallen of late into such ill repute that many teachers, particularly those who have older pupils under their charge, fear to admit that they ever practice it. The extreme attitude in regard to drill is voiced by McMurry,¹ who says, "Extensive drills in the future will be the recourse of those teachers only who lack energy to teach." There are various reasons for this attitude in regard to drill. One is undoubtedly the general dislike that teachers have to take up the burdens of systematically planned and rigorously developed drill. It is not easy or agreeable to keep everlastingly at some habit, fact, or principle that is to be continually presented until it has become second nature to the pupil. The easy way is not to insist on drill, but to relax it and to give the attention to something that is inherently more interesting and has in it less of the element of drudgery.

However, while there is a natural inclination on the part of both

¹ *How to Study and How to Teach*, 1909.

pupil and teacher to avoid drill, it is not for this reason primarily that in many instances it has become almost obsolete, particularly in the higher grades of instruction in the secondary school and the college. It is a matter of common observation that drill does not always yield results at all commensurate with the large amount of time and of energy expended in this drill. Further, experimental investigations in the psychology of learning have shown what may be termed the law of decreasing returns in all drill activities. The first few repetitions of materials to be learned give much higher results relatively than those that follow, and after a time the learner reaches a point where the drill adds very little to his acquisition. It seems time practically wasted to continue drill beyond a certain point. Interest is deadened through continued practice, and attention fails. When this point is reached all attempts at further learning are futile, and the wise teacher stops and turns the activities of the pupil in another and more fruitful direction. Further, investigations in experimental pedagogy, such as that of Rice on "The Futility of the Spelling Grind," published in the *Forum* in April and June, 1897, and that of Cornman on "Spelling in the Elementary School," appearing in 1902, seemed to give color to the contention that a great deal of drill is time thrown away.

However, experimental investigations in recent years indicate clearly that drill, when conducted under proper conditions, is an extremely important factor in efficient instruction. In this connection two studies of Thorndike should be mentioned. He found that practice in multiplying three-place numbers by three-place numbers when this drill consumed a total of only a few hours raised the efficiency of mature subjects to such an extent that at the end of the period they were able to do the task in two-fifths of the time that it had first taken.¹ In a later experiment he found that seven days' practice in adding resulted in an average improvement of 29 per cent.² This increase in ability to perform these operations seems all the more remarkable when it is remembered that exercises in multiplication and addition belong to a class of

¹ "The Effect of Practice in the Case of a Purely Intellectual Function," *American Journal of Psychology*, XIX, 374-84.

² "Practice in the Case of Addition," *ibid.*, XXI, 483-86.

habits that with the adult are supposed to be well perfected at the beginning of the special practice and hence are not as likely to be capable of further improvement as are habits that are at the start less perfectly formed.

Likewise Brown reports in a series of articles in the *Journal of Educational Psychology* for 1911 and 1912 that drill in the fundamental operations of arithmetic—addition, subtraction, multiplication, and division—when practiced five minutes daily for thirty recitation periods, resulted in clear improvement both in speed and accuracy.

Starch found that drill in mental multiplication for fourteen days showed positive effects in improving arithmetic tests in adding fractions and in various other simple operations.

Wallin¹ seems clearly to have demonstrated the value of drill in spelling, when certain precautions are taken to emphasize the words that are being studied. These tests, conducted in the Cleveland schools, gave evidence of remarkable improvement when but a few new words were studied each day and when the words previously learned were properly reviewed. Wallin's experiments emphasize the importance of what has been termed "focalization" in mechanical learning. The material that is the subject of drill must get into the focus of consciousness if the results are to be of much value. In other words, mere repetition is of little avail unless the mind is held on what is being repeated. In order to secure the proper focalization the materials learned must be made as striking as possible. This often means that they be presented under many new conditions. In other words, while the elements that are the object of drill remain the same, the form in which they are presented should be as varied as possible. Mere drill without variety is a deadening occupation, and very soon a point is reached where further advance in learning is checked through the effect of monotonous repetition.

Wallin's tests not only emphasize the fact that the elements on which the learner drills must be in the focus of consciousness; they also show the value of concentration in drill. It is not wise to drill on too many elements at the same time. Just a few facts

¹ *Journal of Educational Psychology*, 1910.

should be selected each study period to be emphasized. A large number of new facts are distracting. The drill should not lead to mental confusion by the multiplicity of new details.

Recently an attempt has been made to determine the optimal length of a drill period and the interval of time that should elapse between successive drill periods. Pyle¹ concludes from tests extending over an interval of two years and conducted with mature subjects that the length of a drill period to obtain the most satisfactory results should be about thirty minutes and that the drill should be repeated daily if possible, since better results are secured than if the drill is given every other day on the one hand or twice a day on the other.

From the present status of the investigations concerning drill it seems reasonable to conclude:

a) Properly conducted drill is a valuable adjunct to efficient teaching where it is desirable to secure mechanization and ready response, as, for example, in the use of words and constructions in a foreign language; in the employment of essential processes in mathematics; in the manipulation of materials in the laboratory and the shop; in the command of fundamental facts in history and the social sciences; in the application of principles and rules in practically all of the subjects of the curriculum. The teacher who out of mere inertia or because of his enthusiasm for the higher things in learning ignores drill is neglecting a large factor in the development of his pupils. It is not true that drill is the device of the inefficient teacher. On the contrary it requires detailed preparation. Carefully conducted drill is the mark of good teaching in every grade of instruction.

b) Variety in presentation is essential in drill. The same materials should be given in as many new settings as possible. It is the old in the setting of new surroundings that most readily secures the attention. Monotony of presentation is deadly to all learning. This principle is particularly important in connection with that drill that is secured through review. There is ample opportunity in review to present the previously learned facts in novel relationships and thus secure attention that would otherwise be lacking.

¹ *Psychological Bulletin*, February 15, 1913, p. 13.

c) The number of new elements that are the subject of drill at any particular time should be small. A multiplicity of details distracts the attention and accomplishes no good result. While the older materials may be added to the new in any drill lesson, the new materials should be the elements particularly held in attention. It is better to attempt a few new words in a foreign language in each lesson and to introduce new principles of construction sparingly than to try to cover a large amount of ground at any one time. Where drill is concerned it is concentration that counts. Nothing is gained by spreading the effort of the pupil over a wide and diversified field.

d) In the case of the secondary-school pupil a drill period of more than thirty minutes is likely to prove decreasingly valuable. It is probable for many reasons that the drill lesson cannot occupy that amount of time daily. It seems better to have a drill period each day for a short interval than every other day for a longer interval.

Closely connected with the topic of drill, indeed scarcely to be separated from it, is that of habit-formation. This is a necessary part of all school instruction and one that no teacher can ignore. In the primary grades the formation of correct habits is perhaps the most necessary phase of the education of the child. Here the best teacher is the one who can inculcate the right habits from the start. While habit-formation is all-important in the first years of school life, it cannot be ignored in the grammar grades nor in the secondary school. On the whole it may be said that the habits formed in the elementary school, particularly in the primary grades, relate more to general school attitudes, while those that the secondary-school teacher should chiefly consider center in the particular courses that he is teaching. However, whatever their nature may be, we have today, thanks to many careful investigations in this field, a considerable amount of knowledge in regard to how habits are acquired. We can consider briefly some of the most significant of the facts that have been established in this field of investigation.

a) In the first place the teacher should be aware that while the aim in habit-formation is ultimately the elimination of conscious

control, the acquisition of any complex habit is greatly facilitated by the learner recognizing the factors involved in the habit-building process. Correct methods of performance may be stumbled on, but the "blundering method" is extremely wasteful and it is the function of the teacher to step in and direct the learning; to see to it that the pupil intelligently grasps what he is doing. There is not a subject in the curriculum in which the pupil may not be materially aided by being shown how to go about his work in the proper way. Hence the teacher should first definitely determine what the best methods of attack are in learning the particular subjects that he has in charge. After this has been done it should be his aim to habituate his pupils in these methods, first by explaining what they are and then showing their value.

b) Efficient habit formation is aided in the second place by the proper affective attitude of the learner in regard to his work. It is imperative that he feel well disposed toward his task, and for this reason it is essential that he achieve a reasonable success in what he is trying to do. The effective teacher will strive in all legitimate ways to give the pupil this proper feeling attitude. Hence, while he may insist on strenuous work, he should never make it so difficult that the average pupil cannot score a reasonable success. Repeated failures make learning impossible. No school subject should be made unnecessarily hard or distasteful. There is no merit in keeping pupils at grinding tasks, merely for the sake of the grind involved. However, there are teachers who apparently fear that the subject that they teach may become too easy and are constantly looking for devices to increase its difficulty. The teacher should strive to make the subject as easy as is compatible with its mastery.

c) In forming a habit the learner needs some objective standard by which he can measure his progress both in comparison with his own former achievements and with those of his fellows. The good teacher should aim as far as possible to set up such standards and make them evident to his pupils. He should consider it one of his functions in recording marks and in giving grades to make them expressive of real attainment. To mark well is a fine art.

d) It has been shown in earlier experiments and conclusively

substantiated by those of the last few years that habits learned in one connection do not of necessity transfer themselves to activities in which there are novel conditions. Whether they do transfer or not depends largely upon whether these habits have become definite ideals in the minds of those who have formed them. The learner must be shown the significance and the value of such habits. This is particularly important in teaching the technique of scientific investigation, in inculcating the value of artistic appreciation and the like. The teacher who wishes these habitual attitudes to carry over from one field to another must see to it that these attitudes are recognized by the pupils in general as valuable.

The question of the conditions under which correct habits are formed is closely related to that of the whole problem of economic learning, that has been given much attention in the investigations of the last decade. It is not my purpose to enter into a detailed consideration of these results, nor to point out their practical importance except in so far as they indicate desirable methods of instruction.

a) The most recent experiments seem to have conclusively established the earlier conclusions arrived at by Lottie Steffens that learning by wholes is more desirable than learning piecemeal. This means as far as instruction is concerned that the teacher should present whole topics for consideration rather than small and relatively disjointed parts. It is particularly important that there should be a preliminary view of the whole topic to be considered. An intensive study of any particular part should always be preceded by a survey of the entire topic. It is sometimes desirable to have this survey extend beyond the bounds of a single lesson and perhaps cover the material of a number of related lessons, centering about the same general topic. Teachers, as a rule, tend to make their presentation too fragmentary and choppy.

b) Although there are some conflicting results, recent investigations for the most part tend to confirm the original findings of Ebbinghaus and show that it is not wise to spend a large amount of time on any one topic of study at any one sitting. For the high-school pupil, as has already been suggested, intensive work for thirty minutes in any one direction is probably better than a longer

period of application. It is better to come back to the subject again at a later sitting than to attempt to master it in one period of study. For the teacher this fact means that it is wise to spread the presentation of a topic over a considerable period and not aim to complete it in a few intensive lessons. The spiral plan of teaching in the elementary school may well be extended with certain modifications to the secondary school.

c) One of the most effective methods of firmly establishing a fact in the mind of the learner is through active recall of what has previously been studied. This means that the teacher should make use of the recitation in a considerable measure as a means of skilfully directing the pupil's attention to the recall of essential facts. In any case the recitation should not be utilized primarily to discover what the pupil knows—it should be a pedagogic device to instruct him in his learning.

d) In all learning there are likely to exist factors that mutually inhibit one another. The presence of interference has been emphasized by a number of experimental studies. Recently it has been shown that two naturally interfering activities, while they tend in the early stages of learning mutually to inhibit each other, may both finally be perfected in such a way that one can be carried on without any detrimental influence on the other. However, this interference can be eliminated only when both activities have been firmly established. This means as far as the teacher is concerned that he should not undertake to present something that he cannot give sufficient time to for its thorough mastery by the pupil. It would be unwise, for example, to have the pupil partly master two foreign languages at the same time, and leave them before the proper language habits had been definitely established. It should be the ideal of the teacher to make relatively complete that which he undertakes to teach. Completeness as an ideal does not mean that he should attempt to teach every detail of a subject (probably most subjects in the secondary school are taught in too minute detail), but it does mean that he should require a mastery of those parts of the subject that he deems essential for the work in hand.

Up to this point we have considered the teacher's art chiefly as consisting in making mechanical certain parts of the materials

of instruction, and we have emphasized those principles that have been discovered by experimentation and observation that bring about this mechanization in its most effective form. Thus, we have considered the laws that govern drill and the principles that must be observed in habit-formation; we have briefly outlined the most effective rules to be observed in the general technique of learning and noted the rôle of the teacher in these important particulars. However, we must recognize that the securing of mechanical modes of reaction is but one of the aims of teaching. The pupil must not only become proficient in the more habitual aspects of his work; he must not only have an ability rapidly and accurately to perform various tasks that are set before him; he must also at times be capable of arriving at new perceptions; of forming new conceptions, and of framing valid judgments. The art of the drill-master must not be despised, but the highest art of the teacher is leading his pupils to think. Here the aim is opposite to that which we have previously considered. Hence the teacher in developing this phase of his instruction must assume an entirely different point of view from that which engages his attention in the habit-building phases of instruction.

Concerning the way in which the mind works in these higher mental processes, educational psychology and experimental pedagogy have as yet much less definite to offer than in the field previously discussed. Yet the results obtained in the experimental psychology of the thought processes justify a few practical and basal conclusions.

a) Chief among these is the fact that we think definitely and clearly only when we have a problem that compels such thinking. Ordinarily our mental processes go on without much effort and largely in a mechanical manner, but this process is changed as soon as some obstacle is placed in our path, and the greater this obstacle is, provided that it does not plunge us into a state of emotional confusion, but is capable of being surmounted, the more developed the thought and the richer in content our mental states. The first important principle for the teacher to keep in mind reads, "If you wish to make the pupil think, confront him with some difficulty; present to him something that breaks up for the time his habitual modes of association and behavior."

How small a proportion of our teaching is of this thought-producing type; how few are the genuine problems that we present in a large part of our instruction, I am sure a little reflection will make evident. I have recently been informed by one who is making an extensive study of methods in secondary education that in the teaching of such subjects as physics and chemistry even the tendency seems to be (if the textbooks employed are accurate indications of the character of the instruction) to insist on the performance of a definite number of experiments in the laboratory, without apparent reference to the fundamental significance of these experiments and an attempt to relate them to the basal principles of the science. If this is true in the teaching of subjects that are so admirably suited to the stimulation of genuine thinking, how much more true is it in other departments of instruction where general principles do not lie so near the surface.

b) It seems probable that the most effective obstacles to the formation of habitual associations are those that are presented negatively rather than positively; that is, we hesitate and consider more carefully when we are told not to do something than when we are given a positive instruction. For example, the subject of an experiment is told that when a picture is presented to him visually he is to respond by a word naming the principal object in the picture, and in this case, while his responses are limited to one particular variety of reaction, and thus not entirely free, they are likely to be definite and ready and not to develop much debate or choice. On the other hand, if the subject is instructed that on seeing the picture he is to reply with anything that comes into his mind with the exception of giving a name to the objects in the picture, his mental processes are much more likely to be raised to the plane of deliberation and decision.

The teacher may on occasions advantageously avail himself of the principle of "negative instruction," as it has been termed, to develop thought. He should accustom his pupils, when there are real problems to be solved and intelligent decisions to be reached, not to follow the most obvious paths, but to hold in check the ready associations that tend to arise in the formation of "snap judgments" and superficial generalities. There are, perhaps, no subjects in the secondary-school curriculum in the teaching of which

this principle may not be applied, but it is particularly important in the interpretation of the facts of history and political and social science, and it can be brought into play in the comprehension of literature, music, and art. We ordinarily treat facts and principles in conventional ways; we are too ready to accept easily formulated opinions; we do not insist enough on a reasonable hesitancy in judgment.

c) It is often desirable to check the habitual flow of ideas not for the purpose of developing logical conclusions, but rather to give to the thought processes a richness and a variety that they do not possess on the lower levels of superficial association. We know from experimental studies that such a checking in the habitual attitudes of mind takes place when associations can no longer flow along in merely verbal channels. It is under these conditions that definite concrete imagery arises to give a body and a significance to the thought processes. It is particularly desirable in teaching such subjects as literature, where appreciation rather than logical judgment forms the goal of instruction, that vivid concrete imagery be developed. Much of the finest in descriptive and narrative literature is passed over unnoticed unless the essential pictures underlying the words and giving to them their significance arise in consciousness. I am sure that we would often be surprised to find how poor in concrete detail are the minds of many of our pupils.

The necessity of arousing vital imagery applies to a greater or to a less extent to all those subjects of instruction that are to be comprehended in concrete rather than in abstract terms. In ordinary teaching there is altogether too much mere verbalizing and too little detailed comprehension. The teacher must at times place obstacles in the way of these merely verbal associations, if he wishes to get the most significant values from those subjects that cannot be understood in their abstract and formal relationships. He must state his problems in such a manner, he must formulate his questions in such a way, that an appreciative attitude will be engendered in the minds of his pupils.

d) It has been adequately shown, not only that problems are necessary to engender thought, but also that the direction that the thought processes take varies in terms of the nature of the problem.

Both experiment and observation warrant the conclusion that we generally find that for which we are looking. When our minds are "set," either consciously or unconsciously, in a certain direction, our thinking follows that particular direction, and the details of our conscious processes flow along in a very definite channel. Our associations are formed in terms of our purposes, our intentions, our interests, our ideals, our prejudices. This natural tendency of thought has been aptly termed by James the "will to believe," and its existence has been clearly demonstrated in recent studies on the higher mental processes. This set of the mind may be technically termed an attitude. Attitudes of this nature appear to be of two different kinds. They are either definitely intellectual or are strongly tinged with feelings, and in the latter case they may be appropriately termed prejudices.

It becomes the business of the teacher to instil in the minds of his pupils the proper intellectual attitude and the proper feeling attitude (the prejudice). Sometimes he must make these attitudes clear and definite in the pupil's mind by raising them to the level of problems to be solved; and sometimes, on the other hand, he may convey through suggestion the attitude that the pupil is to take. In the more definitely intellectual work of the school the explicit problem attitude should be cultivated, but in the work that depends on appreciation and comprehension these attitudes are better suggested than explicitly stated. In any case the teacher should see to it that such attitudes are present in all of the school work that has for its aim either rational interpretation and comprehension or emotional appreciation.

The teacher must take special care to set different problems, to stimulate different points of view, to develop different feeling attitudes with different subjects of instruction. Too often the teacher approaches all subjects with the same general attitude; yet it is perfectly obvious that each subject or group of subjects in the curriculum must have its appropriate method of approach. Obviously the attitude in studying literature and art cannot be the same as in studying natural science; the attitude in which history is studied is not that which will work with equal success in studying a language, and so on. Further, the approach to a subject

often varies with the general purpose and with the grade of the instruction. The secondary school should not employ, for example, the same methods as those used in the university, nor should it make the equally fatal mistake of carrying over the attitude of the elementary school. The teacher must have definitely in his own mind the attitude that may be properly assumed in regard to the subject that he is teaching, and he should know likewise how to vary this attitude from time to time in accordance with the differing demands of different phases of his subject and of the different stages of progress of his pupils. At one time he may hold up the ideal of critical analysis, at another of subtle appreciation and sympathetic comprehension, this variety of attitude depending on the particular aspect of the subject that he is teaching. In any case, he must definitely formulate his own attitude and impress it on the pupil.

e) In developing proper intellectual and emotional attitudes in the mind of the pupil the art of questioning is of vital importance. Questioning may serve two quite different purposes. A question may be employed merely as a stimulus to set off a ready response, as, for example, in the common word-reaction experiment, when the subject is presented with a word, either visually or orally, and instructed to reply with the first associated word that comes to mind. Experiments of this kind have shown that under normal conditions the replies are generally superficial and without special significance; they are opposed to genuine thinking. Such questions as these are suited for the drill work in the school. They are asked when our aim is to habituate the pupil in certain forms of association and to further mechanize a relationship that has already been definitely established. The measure of proficiency under such circumstances is not deliberation but facility in response. In this case the rapidity as well as the accuracy of reply is the measure of the extent of the learning. "Rapid fire" drills and oral quizzes are illustrations of this type of questioning. The aim in the second class of questioning, however, is quite different from this. The latter has for its purpose the development of thought, and the test for genuine thinking is not ease and rapidity in forming associations, but generally quite the opposite. The skilful

teacher who questions with the latter purpose in mind will not rest content with the glib and ready answer to his queries. Under proper conditions the attitude of the pupil will not be that of replying as rapidly as possible with the first idea that arises in his consciousness, as in the case of the simple reaction test, but he will reply only after comprehension, comparison, and decision. The ready answer is often as much an indication of a lack of real knowledge as no answer at all. Recent detailed studies of the conduct of the recitation have shown serious defects in the way in which the questions are framed by the teacher and answered by the pupils.

Miss Romiett Stevens, who made an investigation covering a period of four years concerning classroom practice in the upper grades of the elementary school and in the secondary school, has shown a truly astonishing state of affairs in regard to the extent and the character of the questions asked, not merely by the poorer but by the better teachers. This study is published in the *Teachers College Contributions to Education*, No. 48, and should be read in detail by every teacher who is seeking to correct faults and arrive at better methods of instruction. Particularly instructive are the detailed stenographic reports of typical lessons that are incorporated in the monograph.

Miss Stevens has found that it is not uncommon in a single recitation period covering forty minutes for the secondary-school teacher to ask as many as one hundred and sixty questions. Many of these questions are of the "pumping" type; some seem to be merely an ingenious game in supplying a missing word and assume the character of the so-called "completion test." Generally there is shown very little effort to develop thought or to lead the mind of the pupil in any definite direction. The questions are often badly formed and not infrequently trivial in their nature. Neither pupils nor teachers seem to know where they are going; they are simply conscious that they are on their way. In Miss Stevens' opinion, "the large number of questions suggests the maintenance in the classroom, for a considerable portion of the time, of a highly strung nervous tension when there should be natural and normal conditions." It also "suggests that the teacher is doing most of the work of the class hour instead of directing the pupils in the doing."

There is an over-emphasis on memory work; there is not enough opportunity given to oral expression. The teacher does not take time to frame carefully worded questions, nor does he demand accurate and properly formed replies. Miss Stevens concludes that except in certain drill exercises a large number of questions is an indisputable index of bad teaching; on the other hand a small number of questions is not a proof that the teaching is good. Not only must the questions be relatively few, but they must be well framed and have a clearly defined purpose in view.

f) While the teacher should strive to develop in the minds of his pupils as many helpful attitudes as possible, there is one above all others that he must keep in the forefront of his endeavor. This is the attitude of reasonable self-criticism, the lack of dogmatic assurance, so necessary in all intellectual progress of a high order. The mature learner must always subject his own efforts to such criticism if he hopes to make substantial advance in independent learning and this attitude of mind must be inculcated in the pupil who has progressed beyond the mere rudiments of learning. The teacher, however, cannot expect the pupil to assume this attitude unless he exemplifies it himself. While of necessity he often speaks with assurance and authority, he can never with safety assume the rôle of the dogmatist with pupils of the secondary-school age. He must give the impression that he too is a learner, who stands ready to correct his opinions and reform his judgments when necessary and who is an earnest seeker for the truth; that he is one who in all questions that require deliberation is willing and ready to "think things out" with his pupils and be a sharer in their efforts to arrive at the ultimately valid. There is nothing more stimulating to the pupil than this genuinely thoughtful attitude on the part of the teacher. It cannot be successfully simulated, but when it is actually present it infects the pupil with its fine enthusiasm, and touches with its subtle magic even the dullest minds in the class.